

Year	Stoves	Emissions (tpd)	
		Projected	Extra
2019	350	0.045	0
2020	500	0.065	
2021	600	0.077	
2021 DV	483	0.062	
2020	500	0.065	0.011
2021	600	0.077	
2022	600	0.077	
2022 DV	567	0.073	
2021	600	0.077	0.015
2022	600	0.077	
2023	600	0.077	
2023 DV	600	0.077	

Any Year after 2023 extra will be 0.015

2021	2022	2023	2024
0.062	0.073	0.077	0.077
	0.011	0.015	0.015

5.39084E-05

As calculated in the Portola Plan, the PM2.5 emissions worth of one year's progress amounted to 0.0

1. About 12 percent of days will have PM2.5 concentrations between 20 $\mu\text{g}/\text{m}^3$ and 30 $\mu\text{g}/\text{m}^3$

How much more PM2.5 emissions have to be reduced to attain	
Reductions in PM2.5 emission (tpd) a the attainment date	0.077
Reductions in PM2.5 emission (tpy) a the attainment date	28.105
Emission reductions achieved by 12/31/2018	16.9688
Additional reductions need for attainment (tpy)	11.1362
	28.105

	Emissions	
Emission reductions achieved by 12/31/2018		16.9688
126 stoves @ 2g/hr and 50 devices @ 0 g/hr		11.1473
Total emissions (tpy)		28.1161
Total emissions (tpd)		0.077

	Number of Devices	
Achieved by 12/31/2018		281
Additional* needed to fulfill emission obligations		176
Total		457
*126 stoves @ 2 g/hr and 50 devices @ 0 g/hr		

Number of Uncertified Devices Used as Primary Source of Heat Before Change-out	
Device Type	Before Change-out
Uncertified Stove	711
Fireplace	139

Estimating Number of Devices Subject to Ordinance	
Category	2013-2017 Survey
Households in NAA	2458
Households in the City of Portola (2012 ACS)	1,055
Percent of Nonattainment Area Households Residing in the City	43

Status	Uncertified Stoves
Operating before Change-out Program	711
Replaced through 12/31/2018	269
Additional needed for attainment	176
Remaining in operation after the attainment date	266
Subject to Ordinance	114

Emissions

tpy

tpd

16.9688

11.1362

28.105

0.077

Replaced through 12/31/2018

Additional Needed for Attainment

Remaining In Operation

269

176

266

12

127

Fireplaces

139

12

127

54

Subject to Ordinance

114

54

Number of Uncertified Devices Used as Primary Source of Heat Before Change-out

Scaling factor of 27% was used to scale numbers from Plumas County to Nonattainment Area

Source of Data: 2012 ACS (<https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2012>)

	Area (square meters)	Area (square miles)	Population
Plumas County			19,926
Nonattainment Area	418,966,400	161.764	5,380
City of Portola	14,003,444	5.407	2,679
	3.342378768	3.342523676	49.79553903

From Gabe's email - Used in the SIP

Revised Estimate

Parameter	Fraction	Number	Data Source
County Total	100%	9,109	2012 ACS
Households in Nonattainment Area	27%	2,458	Scaling factor from EPA GIS analysis
Households using woodstoves	57%	1,401	2012 ACS and District Survey
Wood used annually	37%	909	2012 ACS – County Average
Wood used annually in Nonattainment Area	20%	492	District Survey
Breakdown by device type			
Woodstoves	88%	1,356	District Survey
Noncertified/Unvented	53%	711	District Survey
EPA Certified	47%	642	District Survey
Fireplaces Using Wood	9%	139	District Survey
Pellet Stoves	3%	42	District Survey
Woodstoves and Fireplace Insert PM2.5 Emissions (tons/yr)		108	

l2/)

Households	Population Density	
	per m2	per mile square
9,109		
2,458	1.28411E-05	33.25832695
1,055	0.000149963	388.3854263
42.92107404		

**Greater Portola Wood Stove Change-out
Emission Benefit Calculator**

Constants & Conversions	Value	Unit
Old Device Emission Factor	30.60	lb/ton
Old Device Efficiency	54	%
New Device Efficiency	68	%
Wood Use	4.3	cord
Wood Density	1.04	ton/cord
Average Burn Rate	1.5	kg/hour
Emission Rate Scaling Factor	1.5	
Conversion from lb to ton	2000	
Conversion from g/kg to lb/ton	2	

New Device Type	Emission Rate	New Device EF (lb/ton)	Emissions (ton/	
			Before	After
Wood	2.00	4	0.0684	0.0071
Non-wood	0.00	0	0.0684	0.0000
Total				

Category	Old Device	Replacement Wood	Replacement Non-Wood	Total
Emission Factor	30.6	4	0	
Device Efficiency	54	68		
Wood Use (cord)	4.3	4.3		
Wood Density (ton/cord)	1.04	1.04		
Conversion from lb to ton	2000	2000		
Number of Devices	176	126	50	168
Emissions (tpy)	12.042	0.894926118	0	11.14727548

Program

Source

AP-42, Table 1.10.-1

AP-42, Table 1.10-5

AP-42, Table 1.10-5

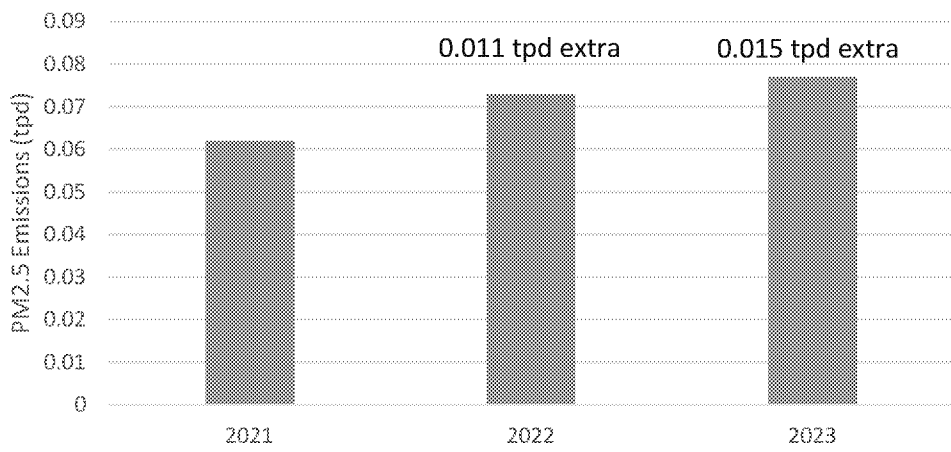
District Survey

CARB Emission Methodology

Gary Blais Personal Communications

year)	Number	Total Emission
Difference	of Devices	Reductions (tpy)
0.0613	126	7.7262
0.0684	50	3.4211
	176	11.1473

Additional PM2.5 Emissions
(Not Needed for Attainment)



Estimating Percent of NA Households Residing in the City (2013-2017 Survey)

Category	Nonattainment Area	City of Portola
Households	2458	1,055

Estimating Number of Devices Subject to Ordinance

Status	Uncertified Stoves	Fireplaces
Operating before Change-out Program	711	139
Replaced through 12/31/2018	269	12
Additional needed for attainment	176	
Remaining in operation after the attainment date	266	127
Subject to Ordinance	114	54

Estimating Benefits of Contingency

Category	Stove	Fireplace before
Emission Factor (lb PM2.5/ton of wood)	30.6	34.6
Wood use annual (cords)	4.3	6
Wood density (ton/cord)	1.04	1.04
Conversion from lb to ton	2000	2000
Number of Devices	114	54
Emissions (tpy)	7.80006	5.82941
Emissions (tpd)	0.02137	0.01597
12% Reduction (tpd)	0.00256	0.00192

Other Benefits 0.0001

Measure	2022	2023 and Beyond
Modified Ordinance	0.0045	0.0045
Full Benefit of Change-out Program	0.011	0.015
CARB Mobile Program	0.0001	0.0001
Prohibiting Open Burning	4.29211E-05	4.29211E-05
Total	0.0156	0.0196

Compare to One Year of Progress

	Contingency	Additional Reductions
Recommended Contingency	0.0085	
2022 Reductions	0.0045	0.0111
2023 Reductions and Beyond	0.00448	0.0151

Percent in City
43

Total

168
13.62947
0.03734
0.00448

20

0.01562

Compare the additional emission reductions to suggested contingency

